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THE Geelong Naturalist.

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JOURNAL OF THE Geelong Field Naturalists' Club.

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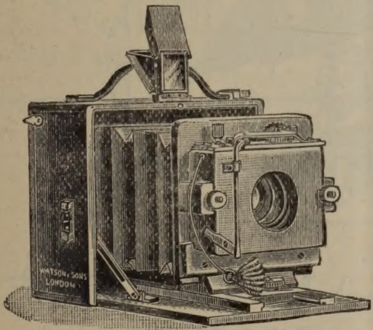

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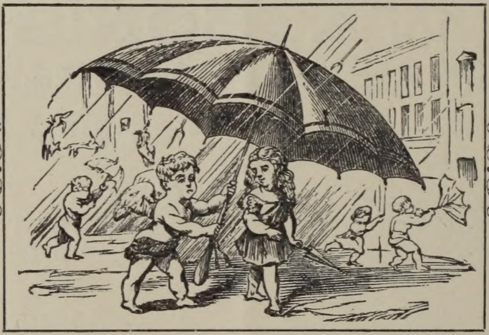

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The Geelong Naturalist.

Vol. V. JANUARY, 1896. No. 2.

The Editor is not responsible for the statements made in any paper.

All communications in reference to "The Geelong Naturalist" should be addressed to the Editor, Mr Hartley E. Williams, c/o the Hon. Sec., and all communications in reference to other matters should be addressed to the Hon. Sec., Mr A. B. F. Wilson, 74 and 76 Ryrie Street, Geelong, Victoria, Australia.

We would respectfully request that all Publications, Specimens, &c., intended for the Club, should be addressed and forwarded to the Hon. Sec. direct, who will acknowledge the receipt of the same without delay.

NOTES.

The Hon. Librarian begs to acknowledge with many thanks the receipt of the following publications:—

"The Victorian Naturalist," Vol. XII, Nos. 6, 7 and 8.

"Census of Plants of the Cape Otway Forest," to October, '95, by G. H. Adcock, F.L.S., F.R.H.S. (From the Author.)

"Dendrotrochus, Pilsbry, Assigned to Trochomorpha," and "Considerations on the Surviving Refugees in Austral Lands of Ancient Antarctic Life." by C. Hedley, F.L.S. (From the Author.)

"Abstract of Proceedings of the Linnean Society of New South Wales, from Jan., 1892 to Dec., 1892; March, 1893 to Nov., 1893; March, 1894 to Nov., 1895; and March, 1895 to Nov., 1895." From the Linnean Society.

We would refer our Members who take an interest in Geology to the "Victorian Naturalist," Vol. XII. No. 6., p. 67. Notes by Mr. T. S. Hall, M.A., on: "A New Method for the Extraction of Friable Fossils."

We beg to acknowledge with thanks the donation of three excellent Views (framed) of Shelford Scenery. Presented to the Club by Mr. G. L. Massingham, of Geelong.

Plectranthus parviflorus (Willd) recorded from Shelford, as a new locality, on the occasion of Club excursion to Golf Hill, Nov. 11th, 1895, by Mr. G. H. Adcock, F.L.S.

MEETINGS, &c., DURING THE QUARTER.

OCT. 11TH—Lecturette—“ Mucor ” (Illustrated) by Mr. H. T. Tisdall, F.L.S.

„ 22ND—Lecturette—“Practical Taxidermy ”—“How to mount a Bird,” (Illustrated), by Mr. W. Shaw.

Specimens exhibited:—Rose-brested Cockatoo, by Mr. W. Shaw.

Nitrification pea and photos of Hakea Grammatophylla, by Mr. G. H. Adcock, F.L.S.

NOV. 5TH—Paper Read :—“Nests and Eggs of the Yellow-breasted Thickhead,” (Pachycephala), by Mr. A. J. Campbell.

Specimens exhibited :—Dyke stone and gold-bearing Quartz, Mr. A. B. F. Wilson.

„ 19TH—Magazine. Papers Read :—“Diseases of Vegetation,” (The Onion Eelworm). “ A Shower of Vegetable Down,” and “ Pasteur,” by Mr. G. H. Adcock, F.L.S.

Specimens exhibited :—Copper Ore from Cobar, (N.S.W.), Mr. W. Errey.

Scoria and pecten cust in iron stone, from Shelford, Mr. J. F. Mulder.

Calcite on Basalt, (Geelong), Mr. A. Wilson ; and a number of Fossils, collected by Messrs Chant and Stock, from Shelford, including :—

Turritella murrayana, Cardita scabrosa, Cythera eburnea, Marginella (sp.) Cypræa contusa, Voluta antis calaris, Pleurotoma (sp.) Dentalium aratum, Columbella aciculata, Fusus acauthostephes, Cypræa (sp.), etc.

DEC. 3RD—Conversational Evening—Members—

Specimens exhibited :—Helix pomatia, (English), Mr. J. F. Mulder.

„ 17TH—Papers :—“ Evolution of Life,” Mr. J. F. Mulder.

“ Oyster Culture,” Mr. W. H. Kingsbury.

Specimens exhibited :—Plectranthus parviflorus (Willd) Mr. G. H. Adcock, F.L.S.

Siliente, and Uatrice Sulphur, from Dobu, British New Guinea, Mr. A. Purnell.

Eel-worms (in vinegar) Mr. W. H. Renton.

Oyster Catcher—Hematopus Longirostris, Mr. W. Shaw.

NESTS AND EGGS OF THE YELLOW-BREASTED THICKHEADS (*Pachycephalæ*).

By A. J. Campbell.

Read before the Geelong Field Naturalist Club, Nov. 5th, 1895.

Of our smaller forest feathered friends few are more beautiful, and certainly none possess sweeter voices, than the Yellow-breasted Thickheads. It is to be hoped that this article will furnish a complete history of their various nests and eggs up to date, besides assist collectors to separate the different species of the birds themselves.

PACHYCEPHALA GUTTURALIS (Latham).

WHITE-THROATED THICKHEAD.

Figure.—

Reference.—Cat. of Bds., Brit. Mus., Vol. VIII, p. 192.

Previous Descriptions of Eggs.—

Campbell: "Southern Science Record," (1882).
North: "Cat., Nest and Eggs, Aust. Birds," p. 64, (1889).

Geographical Distribution.—Queensland, New South Wales, Victoria and South Australia, also Lord Howe's Island.

Nest.—Cup-shaped, composed chiefly of shreds of bark and fine dark colored twigs, neatly lined inside with finer twigs, rootlets, and sometimes portions of fine grass, and placed usually a few feet from the ground in a thick bush in a gully, or in a scrub near a stream. Dimensions, over all about 5 inches by 2½ inches in depth. Egg cavity, 2½ inches across by 1¼ inches deep.

Eggs.—Clutch 2-3; oval in shape, slightly compressed at one end; texture of shell fine, with glossy surface; color yellowish-white, speckled particularly about the upper quarter with spots of dark brown or umber, intermingled with duller markings which appear as if beneath the surface of the shell. In some rare instances the ground color has a pinkish tint with the markings reddish-brown and dull purple or slate, altogether resembling a Honey-eater type. Dimensions in inches of a proper clutch—(1) ·91 x ·68; (2) ·9 x ·67; (3) ·9 x ·68. Of a pinkish set, (1) ·92 x ·69; (2) ·88 ·71.

Observations.—The beautiful White-throated Thickhead is a true scrub or forest loving bird, where its clear sweet voice is oftener heard amongst the flowering Eucalypts than the vocalist itself is seen.

The White-throated Yellow-breasted Thickheads are a trifle puzzling, but strict attention to the geographical distribution greatly assists the oologist in separating the different species or varieties of which there are four.

The general or common species (*P. gutturalis*) ranges from Rockingham Bay district (Q) round to South Australia, grading into the Black-tailed Thickhead (*P. melanura*) on the one hand at Cape York and Northern Territory, and on the other hand into the Western Thickhead (*P. occidentalis*) of West Australian forests, while an insular form, the Grey-tailed (*P. glaucura*) takes possession of Tasmania and some of the intermediate islands in Bass Straits.

I shall never forget with what enthusiastic delight I discovered my first nest of the White-Throated Thickhead. It was the beginning of one November when "beats the first warm pulse of Summer," that I found it in a romantic locality near a clear singing mountain stream at the foothills of the Dandenongs. The home was placed about breast high in a cosy bush, covering it was a most beautiful male bird, with dark and olive green coat, while his pure white throat just appeared above the rim of the nest. The pair of eggs was far incubated, making indifferent cabinet specimens, but it was a long time before I allowed myself to remove them from my collection in favour of a better conditioned set.

I fear I have been tempted to take too many of these beautiful birds' nests as the following extracts from my field book show:—

"Lilydale, 9/10/86.—Took 3 nests of White-throated Thickhead, 3, 2, 2 eggs respectively."

"Ironbark Ranges (Upper Werribee), 11/10/90.—Nest of White-throated Thickhead, beautifully constructed of twigs and skeleton leaves, lined with rootlets and placed in a species of thorny acacia in secluded gully."

"Upper Werribee with Messrs Brittlebank, 8/11/90.—Two White-throated Thickheads' nests—one with fresh clutch, 10/11/90. Another with 3 eggs."

The breeding season is included in the months from September to December.

Note.—With reference to the extremely doubtful species, *Pachycephala rufogularis* founded by Gould on specimens obtained by himself during his explorations in South Australia, I venture to state they are none other than immature birds of *P. gutturalis*. It does seem remarkable if the species be good that the bird has not been re-discovered since Gould's time.

It is true that Dr Ramsay at the Linnean Society, N.S.W., on the 25th June, 1884, kindly exhibited on my behalf "a *Pachycephala*, which Dr. Ramsay on his own authority described as "a specimen of *Pachycephala rufogularis* (Gould) in a remarkable rufescent stage of plumage. The whole of the head, fore and hind neck, chest, sides and centre of abdomen, were of a rich rust red, the interscapular region, rump, wings, coverts and secondaries, washed with the same color."

The specimen was loaned to me by Mr (now Dr) Dombrain. Since, I have seen one or two precisely similar birds in the Lilydale district, Victoria, where fortunately I was also enabled to trace a clutch of 3 from the nest. The date was the 7th November, 1886, and the exact locality, scrub adjacent to the Olinda Creek, where I found the happy family, fully fledged, swelling out their nest, with their handsome yellow-breasted parent in attendance. There was an extra solicitous tone in his sweet voice, especially when I commenced to handle and examine the youngsters. On such clear evidence then I am content to expunge *Pachycephala rufogularis* from my list, seeing it is the youthful *P. gutturalis*.

However in justice to Dr Ramsay, I find he states in "Notes and References" to his "Tabular List," that, "*P. gilberti* is a good species, but *P. rufogularis* is very doubtful. Specimens in the British Museum do not appear to belong to either species, although supposed to be *P. rufogularis* (Gould)."

PACHYCEPHALA OCCIDENTALIS (Ramsay).

WESTERN THICKHEAD.

FIGURE.—Gould: Bds. of Aust., fol., Vol. II, pl. 64.

REFERENCE.—Cat. Bds., Brit. Mus., Vol. VIII, p. 193.

PREVIOUS DESCRIPTIONS OF EGGS.—

Gould: Bds. of Aust., (1848); also Hdbk., Vol. I, p. 208 (1865.)

Campbell: Proc. Roy. Soc., Victoria, Vol. (1890.)

GEOGRAPHICAL DISTRIBUTION.—Western Australia.

NEST.—The usual cup-shaped form, firmly woven of grass and the soft leaves apparently plucked when green of plants, and lined inside with fine grass. Dimensions, over all about 3½ inches by 2¾ inches in depth. Egg cavity 2¼ inches across by 1½ inches deep.

EGGS.—Clutch, 2, probably 3 occasionally; long in shape with both ends nearly alike; texture of shell, fine, with a trace of gloss upon the surface; color, light yellowish-white of a darker shade about the upper quarter where are spots of umber and dull grey, the latter appearing as if beneath the surface of the shell. Some examples have the ground color more yellowish as in those of the White-throated Thickhead (*P. gutturalis*,) with a greater number of markings distributed over the surface. Dimensions in inches of clutch—(1) ·98 x ·63; (2) ·97 x ·63. Odd examples—(Long) 1·01 x ·66; (short) ·76 x ·64.

OBSERVATIONS.—In Western Australia in the acacia scrubs protected by the beautiful leafed Eucalypt (*E. calophylla*,) I frequently observed this lovely bird whose golden breast vied in color with the acacia's bloom. The male bird stands a perfect lover as he calls "sweet" to his grey-colored mate in another tree. She answers lovingly in identical note, "sweet."

Gould regarded the Western and Eastern White-throated Thickheads as possibly identical, while Dr Ramsay in his "Remarks" on his "Tabular List," states:—

"Finding it necessary to separate the Yellow-breasted *Pachycephala* of Western Australia from that of N.S. Wales, I embrace the present opportunity of stating my reasons for so doing, and of pointing out the differences between these two species.

"While lately examining a large series of *Pachycephalæ* from various parts of Australia, my attention was drawn by Mr Masters to the deep rufous tint on the under-surface of the females of the Western examples of the so-called *P. gutturalis*; and after comparing a very large number of specimens from both N.S. Wales and Western Australia, I have come to the conclusion that although closely allied, they are specifically distinct. Mr Gould's description and the plate of the *P. gutturalis* in his work have evidently been taken from Western examples, from which the *Turdus gutturalis* of Latham may be easily distinguished."

The nest and eggs of the Western Thickhead above described I took at Karridale (W.A.,) 28th October, 1889. The structure was securely placed amongst the curious seed pods of a Hakea branch.

The chief breeding months are September, October, November.

PACHYCEPHALA GLAUCURA (Gould.)

GREY-TAILED THICKHEAD.

Figure.—Gould: Bds. of Aust., fol., Vol. II, pl. 65.

Reference.—Cat. Bds., Brit. Mus., Vol. VIII, p. 194.

Previous Description of Eggs.—
Campbell; "Southern Science Record," (1882).
North: Cat. Nests and Eggs, Aust. Bds., p. 66 (1889).

Geographical Distribution.—Tasmania and some of the Islands in Bass Straits.

Nest.—Larger and more bulky than those of the other Yellow-breasted Thickheads, composed of small twigs, sometimes strips of bark with dead leaves (some skeleton) and Casuarina needles added, lined inside with fine dry grass, rootlets, &c., and placed in a bush or low tree in thick scrub. Dimensions, over all 5 or 6 inches by 3 inches in depth. Egg cavity 2¾ inches across by 1½ inches deep.

Eggs.—Clutch, 2-3, occasionally 4. Inclined to oval in shape, diminishing in a pretty curve from the upper quarter to the apex which is, in some instances, sharper than the bottom end of the egg; texture of shell, fine, with surface slightly glossy; color, light greyish, or light yellowish-white of a darker tone round the upper quarter where is freckled a zone of small spots of umber and dull slate, the latter color as usual appearing as if beneath the surface of the shell. Dimensions in inches of two proper clutches. A.—(1) 1·02 x ·7; (2) 1·01 x ·78. B.—(1) ·95 x ·69; (2) ·93 x ·71.

Observations.—I have enjoyed many excursions into the secluded domains—some of them exceedingly romantic—of the Grey-tailed Thickhead of Tasmania and some of the intermediate islands in Bass Straits. It is extremely probable this variety has or may be found on the mainland opposite.

During my brief sojourn in Tasmania, 1883, I was fortunate in finding three nests of this species; the clutches were 3, 2 and 2 eggs respectively, all fresh. The nests were taken on the 17th, 18th and 29th October, and were all heavier built than those of the other Thickheads I had been accustomed to find. On the lovely islets of Kent Group during the visit of the Field Naturalists we took nests of this species. One bird—a female—we shot, had a crossed bill. It was remarkable how the creature could live and enjoy life with such a wry appendage.

On a subsequent expedition to the Furneaux Group when scrambling down one of the granite peaks of Flinders, we took a nest with three eggs in a scrubby nook, being attracted to the locality by the sweet voices of the Thickheads.

With reference to the Grey-tailed Thickhead, a Tasmanian oologist, Mr A. E. Brent, kindly forwarded me the following memorandum—"This bird very rarely lays more than three eggs, but I have taken two or three nests containing four eggs. On 7th October, 1893, I took a nest from a low musk tree in a gully at Austin's Ferry, containing four eggs. I also notice that the earliest laying birds only, or I should say, rarely lay more than two eggs."

Mr G. K. Hinsby another good field observer, found as a rule a pair of eggs was laid during poor seasons. The greater number, three, (he never found more,) were taken when food was plentiful.

Breeding months, October to December.

PACHYCEPHALA MELANURA (Gould).

BLACK-TAILED THICKHEAD.

Figure.—Gould: Bds. of Aust., fol., Vol. II, pl. 66.

Reference.—Cat. Bds., Brit. Mus., Vol. VIII, p. 185.

Previous Descriptions of Eggs.—

Ramsay: P.L.S., N.S.W., Vol. VII, p. 47 (1882).
Campbell: "Southern Science Record," (1883).

Geographical Distribution.—Northern Territory, Queensland, also New Guinea, Molaccas, Louisiade Archipelago, New Britain and adjacent Islands.

Nest.—Cup-shaped, shallow, rather scanty structure of fine roots and twigs lined with rootlets and grass, through the bottom of which the eggs can be seen; it is about 3 or 4 inches in diameter by 1½ deep (Ramsay).

Eggs.—2, possibly 3 occasionally; ovals in shape, slightly compressed towards one end; texture of shell, fine, with a trace of gloss upon the surface; color, light yellowish-white with markings mostly about the upper quarter of dark olive or umber, having the appearance of spots and smudges struck on obliquely or in a downward direction; a few grey markings also appear as if beneath the shell's surface. Dimensions of an average of three examples, ·83 x ·63 inches.

Observations.—I am very dubious about the wisdom of Dr. Ramsay, after skipping the intermediate localities on his "Tabular

List," to insert this extreme northern species into the Dawson River district column. When in that district I paid especial attention to the Yellow-breasted Thickhead inhabiting the Brigalow (a species of acacia) scrubs where Dr. Ramsay's specimens came from, and could see no appreciable difference (except that it appeared a slightly smaller bird) between the species there found and the common Thickhead (*P. gutturalis*) of elsewhere. However I bow to Dr Ramsay's judgment in this matter, and by so doing save reducing by one the number of species in my egg collection. However, according to Dr Sharpe, I fear Mr Master's *P. robusta* must sink as a synonym in favour of the Black-tailed Thickhead (*P. melanura*).

Mr Dudley Le Souëf corroborates Dr Ramsay's statement about the very frail nest built by this variety. During a collecting trip to "Coomooboolaroo," September, 1893, Mr Le Souëf notes—"In a close bush we found the nest and egg of the Black-tailed thickhead (*P. melanura*), but the structure was so slightly built that the egg was in danger of falling out."

NOTES ON LECTURE BY MR. H. T. TISDALL, F.L.S., ON "MUCOR."

Delivered before the Geelong Field Naturalists' Club, Oct. 11th, 1895.

MR. H. T. TISDALL, F.L.S., of Melbourne, delivered one of his popular and instructive lectures on Friday evening, Oct. 11th. The subject chosen being "Mucor." There was a very large attendance of members and friends. The chair was occupied by Mr. G. H. Adcock, F.L.S.

Mr. Tisdall, who is an honorary member of the Club, received a very hearty reception.

The lecturer dealt with his subject in a most entertaining manner, keeping his hearers interested from the start of his remarks to their close. The following heads being dwelt upon, and lucidly explained by Mr. Tisdall, by the aid of diagrams and drawings on the black-board. (1) Protococcus, a microscopic plant found in stagnant water; (2) Spirogyra, also found in stagnant water; (3) Bacteria, distributed everywhere as an invisible dust, both in air and water; and 4, "Mucor," one of the common moulds to be found on damp bread, etc. The two methods of reproduction in "Mucor," were also described by the lecturer, namely:—1st, The formation of the Spore; and 2nd,—The formation of the Zygaspore. The different stages of reproduction were minutely described. 1st—How the upper end of an Aerial hypha swells, forming a septum, making a complete cell; and 2nd,—How the cell grows.

At the conclusion of the lecturer's remarks, Mr. F. R. Pincott, moved, seconded by Mr. W. Shaw, that the best thanks of the Club be accorded to Mr. Tisdall for his highly interesting and instructive lecture. The motion on being put was carried with acclamation. Mr. Tisdall briefly acknowledged the compliment, and has kindly promised to give another lecture at an early date.

* THE AGE OF BASALTS AROUND GEELONG.

By Mr. J. F. Mulder.

Read before the Geelong Field Naturalist Club, September 10th, 1895.

The Geology of the Valleys of the Moorabool, Leigh and Barwon Rivers, with the flat lands extending between the Cape Otway Ranges, Barrabool Hills and Waurn Ponds, indicates that these depressions were originally formed by ocean currents.

These currents appear to have washed away great masses of the older secondary and other rocks, causing such valleys as those of the Moorabool and Leigh. These valleys and depressions were in turn filled up with the skeletons of corals, shells and bones of fish such as sharks, and thus was formed the limestone rock. This limestone is of early Eocene age, there being less than 2 per cent. of living shells found in it, and it is found all over this district.

The depth of the sea in which this deposit was formed was probably from 40 to 60 fathoms and upward, as it is found that that is about the depth that corals thrive best in at the present day.

In this district the limestone lies, in most cases, directly on the older rocks. For instance at Waurn Ponds on the right hand side of the Colac Road in the bottom of the creek it is freestone (Mesozoic,) but the hill beside it is limestone of the district Again up the Moorabool valley you have it overlying the granite, while at Curlewis and Eagle Rock it rests on the Eocene basalt. At Curlewis I know that at present the blue fossil clay lies on the basalt, but that fact is easily disposed of by supposing that the limestone was washed away before the clay was deposited. The same process is going on now around our coast-line. The ancient softer formations are being washed from the harder underlying rock, and the forms of life existing now are being put in their place mixed with mud and silt. The limestone underlies the fossil clay. This we know is the case, for in the shaft sunk at Belmont the men had to sink through the fossil bearing clays to reach the

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*** For Diagrams relating to Basalts see page 20.**

limestone underneath. Messrs Hall and Pritchard in their report of the Curlewis bed say the same thing, viz., that the limestone underlies the blue clays.

There appears to have been a gradual upward movement of all this portion of Victoria during the Eocene period, and as the bottom of the sea rose above the zone at which corals thrive, and approached that zone in which the whelk, oyster and cockle do best, these forms took their place. At the same time the rivers and creeks cut their channels through the upper deposit bringing the clay and mud down, and covering up the shells and preserving them to the present day.

After the lower Eocene shells were deposited, the land appears to have been above the sea level (at least a great portion of Victoria) for we find no middle or upper Eocene shells. In most instances about Geelong we find a considerable depth of loose white sand, apparently of river-deposited material, and overlying this a mass of basalt that appears to have filled up the beds of the Eocene creeks and rivers.

In comparing the different geological sections revealed in Victoria, we are forced to the conclusion that they are of three different ages. First we have the basalt underlying the Eocene, such as Eagle Rock and Curlewis. This must be either older Eocene or Cretaceous. Secondly, Miocene as at Landridge Gully, Scalp Creek, and Connor's Plain in Gippsland.

In some cases this basalt lies directly on the lignite and plant beds (the plants being Miocene forms). In others it rests on a fine white silty sand (see section at Scalp Creek) of freshwater formation, Fyansford Hill and other sections round Geelong.

The survey says that this "older basalt," as they call it, marks the close of the Miocene age, and that this is the case there can be scarcely a doubt, if we study the basalt flow at Marnock Vale and Fyansford Hill. There again we have a section. We have a Pliocene river carrying the bones of the animals of that age, cutting its way through the older basalt and Miocene river silty sand down to the Eocene clay-bed, and in some cases through the older limestone to the bedrock, which may be the bottom Tertiary, Volcanic (Curlewis), Mesozoic freestone (Barwon River), or slate and granite (Moorabool River).

The quarries from which we get our bluestone for the streets is a part of this Miocene flow, and I have followed it from Connewarre Lakes on the north side of the river, up to some miles beyond Maud. About Geelong the persistent feature is its lying in most instances on the bed of white silty sand. There is evidence of a thin sheet of this flow extending over most of the hills about Highton, but there is nothing left now but ironstone nodules, the inferior deposit being stained red with oxide of iron.

I think the reading of Mr Murray, Government geologist, is correct, although it has been questioned by others. He says in his "Geology and Physical Geography of Victoria" page 18, "volcanic rocks of the middle Tertiary period constitute the surface formation of various small areas in the Geelong district, around Melbourne, near Bacchus Marsh, Ballan and between Lethbridge and Steiglitz," and this volcanic sheet is continuous from Lethbridge to Connewarre Lakes, with the exception of a few breaks, and these breaks are filled up with Pliocene drift. Some of them having Pliocene animals' bones, others gravels mixed with pieces of slate and mudstone, and carrying a small amount of gold and classed by Mr Selwyn as Pliocene. When we consider the above facts, I think we can rest satisfied that the age of the basalt which is so plentiful about Geelong is Miocene.

The basalt at the south side of the Moorabool between the Paper Mill and Dog Rocks, appears to be of more recent age than that before mentioned. It is probably of Pliocene or Pleistocene age. There is no doubt it extends the whole distance between those two places in a thin sheet. Although most of this is now decomposed, leaving nothing but ironstone pebbles in patches, it still exists as basalt. This is on a different level altogether to that on the north side of the river It also overlies the gravel bed which I take to be Pliocene if not younger. This is proved by a waterhole near the school, and the shaft sunk near the Dog Rocks. The centre of volcanic activity at this time appears to have been about Fyansford. Several crater like basins are still to be seen there, and a granite tor, some tons in weight, is lying near the Starch Mills. Most likely this was blown up at the time of the output, for there is no granite nearer than the Dog Rocks, some miles distant.

EXCURSION TO SHELFORD.

THIS excursion took place on Monday, the 11th November. The principal object being to inspect a certain formation, which at present is a much discussed question, in regard to its geological age. A thoroughly representative party filled a large drag, and with a splendid team of four, left Geelong at 5.30 a.m., and covered the distance to Shelford *via* Leigh Road, punctually by 9 o'clock.

By previous invitation, the party was sumptuously entertained at breakfast at Golf Hill. Miss Russell, Miss Carstairs, Messrs Bell and the Rev. H. M. Burn, M.A., B.D., were unremitting in their efforts to promote the comfort, and add to the pleasure of every member, who fully endorsed the vote of thanks so ably put by Mr. G. H. Adcock, F.L.S., one of the vice-presidents. After breakfast the whole of the noble estate was freely placed at the disposal of the members by the courteous proprietor. A visit was then paid to some of the romantic Gorges, a few miles up the river, where the Silurian formations were inspected, and several specimens obtained. Here Mr. Swan, of Shelford, was met with, and not a few of the ardent, but wearied collectors, will gratefully remember this gentleman's kindness in placing his buggy at their disposal. Some exquisite views were obtained by Mr. G. L. Massingham, and a number of botanical specimens, of rare occurence, were secured by our enthusiastic botanist (Mr. G. H. Adcock) who records Shelford as a new locality for Plectranthus parviflorus (Willd.)

Mr. J. F. Mulder found a new fossil bed, and had considerably over 100 varieties as trophies ; he was also seen, with his customary enthusiasm, chasing a new species of the Lepidoptera, and his perseverance was rewarded by the capture of quite a number. On returning to the homestead, light refreshments were partaken of, and soon after 4 o'clock a start was made for the Red Bluff. Here fossils engaged the attention of members for a considerable time. Splendid specimens of Voluta antis-calaris, Triton protensus, Turritella murrayana, Cardita scarbosa, Cythera eburnen, Voluta ancilloides, and others were obtained. While busy at work, the Club photographer took a snap shot. One or two Ornithological specimens were secured, namely, Strepera graculina, Playcerus eximius, Euphema elegans and Hieracidea berigora ; also others noted, namely Aquila audax, Hirundo neoxena, Artamus sordidus, Callocephalon galeatum and Geronticus spinicollis. After tea a start was made for home, and passing through Inverleigh, the party safely reached home after a most enjoyable and instructive day, and having received kindness of no ordinary character at Golf Hill. The arrangements were carried out without a hitch by the club's energetic secretary.

OYSTER CULTURE.

By W. H. Kingsbury, late Travelling Inspector of Fisheries.

Read before the Geelong Field Naturalist Club,
November 17th, 1895.

Experts on oyster culture affirm that there are very few localities suitable for oyster farming. Oysters abhor sand, and where sand is oysters cannot possibly exist. The reason is, the grains of sand get into the hinges of the oyster, and, like a stone in the hinge of a door, prevent his opening and shutting his shell. The sand smothers the oysters, he gapes his shell and dies.

The oyster has many difficulties to encounter One of his worst enemies is the "five-finger," or star fish. It entwines the oyster in his deadly grasp, and by protruding his elastic body eats up the oyster, leaving nothing but empty shells. Another enemy is what is termed the "dog-whelk." These have the power of boring into the oyster shell with their rasp-like tongue, and they often destroy hundreds of pounds worth in a season. The stingray also is very destructive to oysters, also mussels, which with their curious silk-like webs, and by which they are enabled to anchor themselves firmly, collect the mud when there is a run of tide, and if the oysters are underneath, unless released by a dredge, become smothered.

The oyster is intolerant of cold and very tolerant of heat. During the winter season owners of oyster beds in England and the continent, watch the weather very carefully, shifting oysters from the fore-shore into deep water to prevent the frost nipping them up. Experiments have been continually made, with the result that cold is fatal to young oysters. It is necessary and essential when there is a fall of spat that the temperature should be as equable as possible. If it is cold, they die; if warm, and they are lucky enough to find cradles in the form of "culch," suited for them, they hold on as tight as barnacles, and have a chance of living.

A fattening place for oysters is seldom a good breeding place. The fattening ground must be situated in water, with which a certain amount of river water mixes with the sea water. Fresh water alone is sufficient to kill oysters. It often happens that valuable layings of oysters have been destroyed because they have been placed too high up creeks, where the lands waters are too powerful for the flowing tide to dilate them. It is a very great pity that oyster dealers waste, by throwing away into tubs, tons of shells of oysters that have been opened in their saloons. From the shop they are carted to the rubbish heap, instead of being collected and put back into the sea, especially where oyster beds or breeding grounds are situated; by so doing they would form, above all things, the best form of "culch" to attract young oysters.

It is in the month of November in this colony that oysters mostly spawn. The spat, as it is so called, resembles very fine slate pencil dust, and the number of spats in one oyster has been found by experiment, by experts, to number from 220,000 to 270,000 individually. On fine hot days the mother oyster opens her shell, and the young ones escape from it in a cloud, which may be compared to a puff of steam from a railway engine. Each little oyster is provided with swimming pads, and by means of these they begin to play about the moment they leave their mother's shell. They swim away with the tide to and fro till they die or find a rest suitable for themselves. Oysters, in fact, may be said to "swarm" like bees, and many a bed has been discovered, the origin of which is attributable to a swarm of oysters having alighted on the spot.

Owners of yachts should be asked to keep a good look out for undiscovered oyster beds, and heave a dredge overboard whenever possible, and it is very likely beds of oysters hitherto unknown, may be hit upon. The little oyster, the size of a threepenny piece, and that of a sixpence, are called "brood," the larger are called half-ware." These young oysters increase in size by adding to the margin of their shell a very delicate layer of horn-like substance which eventually hardens into shell, this is called the "growth." In well marked oysters the rings of annual growth are plainly perceptible. If the shell be well washed, the growth will take the marking of a pencil well, and it will be found that the oyster is generally in the fifth or sixth year before it is fit for sale.

The food of the oyster consists of very minute organisms which some experts call animal, some vegetable; and those who are of a microscopic turn of mind will add to the general store of knowledge if they will take the trouble to examine and report on the contents of an oyster's stomach. The oyster's mouth is situated between the delicate folds of what is ordinarily called the beard, *i.e.*, the breathing organs, and by following down the course of the gullet, the stomach can easily be found embedded in the thick part of the body of the oyster, which is really the liver.

Oysters may be divided into two classes—the natives and deep sea; between these there are several varieties. The points of an oyster are:—first, the shape, which, to be perfect, should resemble the petal of a rose leaf; second, the thickness of the shell. A native should have a shell like a thin china tea-cup. It should have also a metallic ring, and a peculiar opalescent lustre on the inner side. The hollow for the meat of the oyster should be as much like an egg-cup as possible. Third, and lastly, the meat itself should be white and firm, and nut-like in taste.

I omitted to mention when writing of the enemies an oyster has to contend against, that it has also its friends. Periwinkles are friends to oysters, and are largely employed to keep the beds and "culch" clean, by eating up the slimy, green weed that grows so abundantly, especially in hot weather. Mussels are no friends to oysters. A colony of mussels will, unknown to the proprietor of an oyster bed, often settle upon the "sperm gregis" of "half-ware," so carefully deposited to grow and fatten. I would here remark that there is no real "fat" in an oyster; to fatten oysters is, therefore, an expressive but not correct term. One thing I would advise my readers to do, and that is, never to allow the oyster to be served to them on the flat shell, but always on the round shell, with the natural liquor left in the hollow. This liquor is not sea water, but contains much of the same chemical ingredients as the oyster itself, and is usually thrown away as useless.

The following is an analysis of the meat of the oyster:—

1st—Water containing hydrochlorate of soda—hydrochlorate of magnesia—sulphates of soda, lime, and magnesia.

2nd—Much phosphate of iron and lime.

3rd—Much omazone and glycogen.

4th—A certain quantity of gelatine and mucous.

5th—An animal material of which phosphorous is the principal element.

Western Port and Corio Bay years ago had their natural oyster beds. In the latter, the deposit of the silt from the dredges on the eastern and southern portions has, to a very great extent, destroyed valuable oyster breeding grounds, but from practical experience I would strongly recommend the following places as being specially adapted for the cultivation of oysters, viz., Western Port Bay, towards Tooradin; Mud Island, near Queenscliff; on the Bellarine Coast, near Clifton Springs; the western portion of Corio Bay, from Hutton's Wharf to the North Shore, and the Duck Ponds (Lara) Lagoon. The above-mentioned places are within a short distance from a centre, and therefore easily supervised.

I feel assured that the class of oysters known as the Stewart Island, from New Zealand, would thrive well in any of the above mentioned places.

MR. J. B. WILSON, M.A., F.L.S.

Since our last issue we, and the scientific and scholastic worlds, have suffered a severe loss by the death of our Patron, Mr. J B. Wilson.

To the very last he showed his deep sympathy with and interest in our work. Only a month before his death he did yeoman service for the club at a critical juncture. Though he was an enthusiastic and accomplished scientist, yet his vast store of knowledge was always at the disposal of the merest tyro. Especially as a club shall we miss his generous help and wise counsels The writer treasures up the kindly letters he received early in his scientific career from Mr. Wilson, who welcomed him to the ranks of scientific workers as a " brother botanist."

While his researches were not limited to any one particular branch of natural science, yet it was to the study of the varied forms of marine life that he more especially devoted himself with great distinction and success. Particularly in this branch he achieved a world-wide reputation, and was universally regarded as an authority. A great many algæ, polyzoas and kindred forms were first described by him, and he added greatly to our knowledge in these interesting branches by his patient and methodical investigation. Undaunted by a stiff breeze or heavy swell he perseveringly prosecuted his dredging operations, and his well-known yacht was quite a feature in the Straits during vacations.

In 1882 Mr. Wilson was elected a Fellow of the Linnean Society of Great Britain, a distinction only accorded for original research which must be certified by competent and reliable persons. Last year he was also elected a Corresponding Member of the Royal Botanical Society of Regensburg, Bavaria. This was another high tribute to his scientific attainments. Those who knew him best, loved and admired him most, and will now long, in the pathetic words of our late laureate,

> " For the touch of a vanished hand,
> And the sound of a voice that is still."

IS THERE A BUNYIP?

By Mr. D'Arcy.

In 1872, as near as I can remember, a Mr. Haigh, Mr. Dennant, and I went down about Christmas time from Ballarat to have some shooting on Corangamite. We got down to a farm-house, about half a mile from the lake, about 8 o'clock. After we had tea, I proposed that we should walk down to the lake and see if there were any ducks, Cape Barren geese, or anything else worth shooting. Mr. Dennant would not go; but Mr. Haigh agreed. It was full moon, and as bright almost as day, and no one, who has not been down on those plains in the Western District, can conceive their loveliness on a moonlight night. The air seems loaded with health. Everything is so calm, that I verily believe you could hear people speaking in their ordinary tones a mile off. Well we started, and as we got within 100 yards of the lake, Mr. Haigh said, "What is that on the edge of the lake?" I said, "I did not know, but I thought it was a sheep or a large dog." "How can that be?" said he, "there are no sheep about here, and no houses for a dog to come from, and what would a dog be doing down there, at this time of the night?" However, as we got closer to the animal, it began to go into the water, a fact we both wondered at, particularly if it were a sheep or dog. When we got about 60 yds., it had gone in deeper, so I said, "Be it a sheep or a dog, I am going to fire at it." "All right, we will both fire together," said he. We did so, when with a plunge it disappeared. Some little time afterwards, I had shot a lot of ducks, at the mouth of the Woordie Yallock Creek, where it empties into the lake, and as they were carried into the lake for some distance, and as I had no dog, I was going to swim out for them, when a man came down with a little punt in a spring cart. I told him if he would go for them, he could have half. He did so; but while I was looking at him, I heard him scream out, and presently he capsized the punt and swam for his life into shore. When he got in, he could hardly stand, and told me that just as he was taking up the last duck, an animal like a big retriever dog, but with a round head and hardly any ears, had come up close to the boat, and that he had got such a fright, that he had capsized it. I must tell you, gentlemen, that previous to this, when I was living on the Big River (a tributary of the Goulburn) near Gippsland, I had to go to Enoch's Point for my letters, a distance of six miles. One evening, about seven o'clock, I started to go up, walking of course, (I was expecting some important letters from home.) I took two kangaroo dogs with me, one of them being a Scotch staghound, given to me by T. D. S. Heron, Esq., at that time Warden of the gold fields, on Fryer's Creek, and afterwards, I believe, Police Magistrate, in Geelong. This staghound was the gamest and pluckiest dog I ever saw, and saved my life once in a fight with a kangaroo. Well! it was a beautiful evening in the summer time, and it was a lovely walk through a primeval bush. I got to Enoch's Point about 9 o'clock—or may be a little before—and got my letters. By the time I had got to the scene of my adventure, it was as dark as it would be, but the stars were shining, and you all know, that after you have been out for a time on that sort of a night you can see pretty plainly. I had got back about four miles—I must tell you the road lay along the river—when I could see something close to the edge, I thought it was a kangaroo, so I set the dogs on it, they ran a little way towards it and then ran back, making a sort of whining growl, as all dogs do when they are not sure what anything is. I then ran forward to this thing, but it tumbled into the water, swam across, and got out of sight. It looked much the shape of a boy swimming, only that it had more of its back above the water. Of course, in the dark, I could not see it distinctly. These are the only two occasions I have seen this, whatever it is; but others, of whose veracity I can vouch, have seen something similar.

When I was teaching in Haddon, near Ballarat, I used to often go out fishing and shooting on Mr. Philip Russell's station. Part of Lake Burrumbeet is on his run, and connected with the lake by drains are large dams which go by the names of No. 1 dam, No. 2 dam, etc. One day as I was shooting I met two men who had been fishing from about 5 p.m. the day before, and they said that just as it was getting dusk, as they were fishing at the mouth of a creek running into the lake, an animal like a retriever dog put its head out of the water and looked at them, they were both so frightened that they ran away from the creek and left their fishing rods until the time I saw them. If you remember the animal seen by the man when he capsized the boat on Corangamite, was also described as being like a retriever dog. Again, some little time after, a gentleman, Mr. McVitty, who afterwards stood for Grenville, told me one day when he met me down at Burrumbeet, that he had had a curious experience a little before he saw me He and another gentleman had driven in a buggy down to No. 1 dam, and Mr. McVitty got out of his buggy, went through a fence, and into an old enclosure covered with long grass and scrub to see if there were any game on the dam. He did not take his gun but crept through the scrub till he came in sight of the water. When he got sight of it—but when he was some distance from it—he saw the water splashed about as if ducks or some other birds were causing the commotion. He crept closer when he saw a large animal like a big curly dog, rolling about, diving, coming up again, and as it seemed playing about. He went back quietly for his gun and loaded with heavy shot. Just as he got back and was going to fire, he stepped on a stick, which broke, and nearly threw him down. The animal went down like a flash, and although he waited for some time, he never saw it after. Now, gentlemen, I have told you all I know about this mysterious animal.

Some years ago there was a question asked in the "Australasian" about two peculiar animals that were seen in the Murray River, something like big dogs. The answer was, that they were most likely some kind of fresh water seals. My opinion is that these animals are either some species of seal, or that they are a species of manatee, as found in the Amazon, or like the dugong found in the seas washing the coast of W. Australia, and which are killed in great numbers for the sake of their oil. The manatee or sea-cow as well as the dugong have some peculiarities in common. They are both mammals; they are generally in an upright condition when seen at the surface. They have breasts like the human species, and they both carry their young pressed close to their breast, holding it by means of their flippers. It is thought, that as the face of these animals is something like that of the human being, they have given rise to the tales we have heard of mermaids. My principal reason for giving the above reminiscences is to cause a discussion as to what these animals are, and whether it is not possible that the bunyip is not such a myth as most people are inclined to make it.

My hobby has been the study of the fauna of every country, and I have never heard a bird whistle or a strange noise that I have not tried to find out what it was; and situated as I have been in the early days in this colony, and travelling as I have done all over the widest parts, long before they were settled, I have had opportuities of becoming acquainted with the habits of—I think, I may safely say—every animal to be found in Victoria. I must conclude now, and if this little narrative has given you half the pleasure while listening to it that it has me in writing—as it has recalled some of the happiest times of my life—I shall be perfectly satisfied.

Since writing this, I have heard from G. F. Link, Esq., that the Rev. Mr. Hagenauer, of Gippsland, has got the skin and skeleton of a veritable fresh water seal, or as the blacks call it "The Bunyip.'

TRIGONIA OR THREE ANGLED.

By Mr J. F. Mulder.

The text books say there are 100 species of these fossils. They make their first appearance in the trias, and were not known to exist in the Tertiary, until they were found in the Australian beds. Besides this, three species are found living in our waters.

The shell of the trigonia is thick, tuberculated or ornamented with radiating or concentric lines or ribs; hinge teeth two and three, diverging and transversely striated; centre tooth of left valve, divided. The animal has a long and pointed foot, bent sharply, heel prominent, the sole bordered by two crenulated ridges; palpi, small and pointed; gills, ample, the outer one smaller. The Shell of trigonia is almost nacrous, and is seldom found in limestone, except in casts silicified. Casts have been found in some formations in which the animal itself with its gills have been preserved. It is said the trigonia is able to leap over a ledge four inches high, and by that means, often escapes from the boat into the sea; they are supposed to be migratory, as dredging for them is very uncertain, though they abound in some parts of Sydney Harbour, and we also get them around our own coasts.

The fossil trigonias are very abundant at Spring Creek and Maud, there casts are also found in the Belmont deposit, and the limestone at Maud is full of them The two species shown are T. Tatei, a new species, and named by Mr. Pritchard of Melbourne; and T. Margaritacea, found at Barwon Heads, by the late Mr. J. Bracebridge Wilson.

OBSERVATIONS ON SOME CRUSTACEAN SPECIES.

By A. B. F. Wilson.

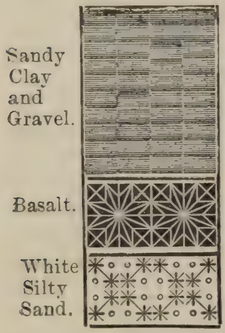
In the order Stomapoda, we have the locus or mantis shrimp, (squilla mantis) which is a very interesting species; it is so named on account of its resemblance, in outward appearance and habits, to the mantis insect. These crustaceans mostly inhabit deep waters, their habits, like the mantis insect, are very voracious.

I am indebted to my friend, Mr. W. Johnston, for a very fine specimen, which was caught just outside Hopetoun Channel in May, this year, '95, in about twenty-three feet of water, one or two have occasionally been caught in our bay (Corio) but they were never known to appear near Hopetoun Channel or in our bay in large numbers till June this year, when a great number of them were caught.

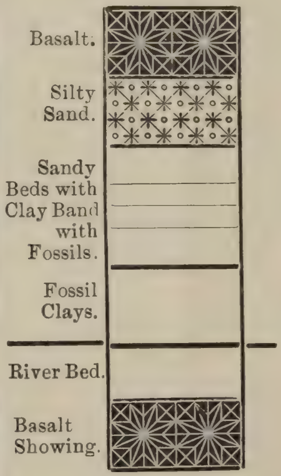
The specimen I have measures 6¼ inches from head to tail; from the tips of the antennæ to the tail 8 inches, and across the carapace 1⅞ inch. The body is somewhat flattened and divided into three lobes, the abdomen is long and jointed, with the terminal segments divided. The first pair of legs are largely developed, and are adapted for seizing hold of different objects, these legs terminate with one large claw, three smaller claws branching inwards from the large ones, all of which are excessively sharp-pointed. There are six smaller legs, the tips of which are very sensitive. This creature is also supplied with a single pair of true foot jaws called maxillipedes; there are six other foot jaws, which I notice are used for swimming, and which are well adapted for their purpose; the foot is very much like a small round leaf, and presents a good surface against the water for propelling this creature. The eyes, four in number, are supported upon foot stalks, as in decapoda, the sense of sight is highly acute, they observe the least movement; the antennæ are remarkably sensitive, the most delicate contact is noticable. This sensitiveness I perceived on touching delicately the antennæ with a very soft camel's hair brush, even the touch of a single hair caused the creature to move, so highly sensitive is this organ.

The hinder appendages near the tail are used also for swimming, but more especially, I think, for supporting itself when in an upright or sitting position. The tail is very powerful, and is used to spring or jump with. Eight segments from the carapace thorns are slightly developed, the ninth segment thorns are developed, the tenth and posterior segment thorns are highly developed. These thorns are used for offence and defence, which I found out practically. The specimen given me I kept alive for several days in a glass aquarium, and closely watched its movements. Seldom did I find it in a crawling position, but mostly sitting up upon its tail, supported by the hinder appendages already alluded to. At the least movement of my hand in front of the aquarium, the creature would make a spring, dart in a curved position to the bottom of the aquarium, coming up again upon its tail, this evidently being, I think, the natural position of these crustaceans in the deep.

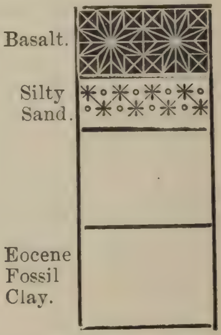
Section under Flinders School.



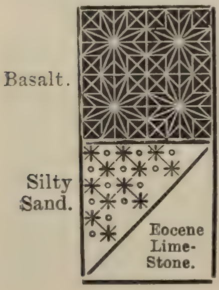
Fyansford Hill Orphanage.



Half-way between Dog Rocks & Fyansford.

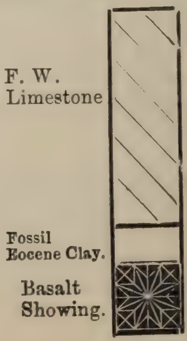


Marnock Vale, across the River.



of Belmont.

Lime Burners' Point.



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